(19)The Korean Intellectual Property Office (KR)
Unexamined Patent Application (A)

(51) Int.Cl. 6
A61C 8/00
A61C 13/00

Application No	10-2003-0018745
Application Date	2003-03-26
Publication No	10-2004-0083995
Publication Date	2004-10-06
Agent	Hyeong-Geun Park
Inventor	Yeong-Taek Seol
Applicant	Yeong-Taek Seol
Examination	Requested
Title of Invention	Helical implant.

Abstract

The invention relates to the helical implant. And the helical implant according to the present invention comprises the screw four sides of the screw thread as to the helical implant, in which the screw thread is formed is one or more concave portions.

The helical implant according to the present invention has the effect that the contact area with the dining out site is multiplied and the mechanical bonding of implant is intensification made and the load of the dining out site is decentralized.

Representative Drawing(s)

Fig. 1

Keyword(s)

The implant, screw four sides, laser machining, pattern, brain.

Description

■ Brief Explanation of the Drawing(s)

Figure 1 is a cross-sectional view showing the triangle pattern formed in the screw four sides of the helical implant according to the present invention

Figure 2 is a cross-sectional view showing the step type pattern formed in the screw four sides of the helical implant according to the present invention

Figure 3 is a cross-sectional view showing the arc pattern formed in the screw four sides of the helical implant according to the present invention

Figure 4 is a cross-sectional view showing the mixed mode pattern formed in the screw four sides of the helical implant according to the present invention

Figure 5 is an enlarged diagram showing the display micro-processing the catheter tube

The enlarged diagram showing the screw four sides of the fig. 6 silver conventional implant.

Figure 7 is a cross-sectional view showing the conventional implant

Figure 8 is a transverse cross section showing the conventional implant.

The description ♥ of the denotation about the main part the upper part of ♥ drawing.

100a: triangle pattern 100b: step type pattern.

100c: arc pattern 100d: mixed mode pattern.

10a: screw four sides 10b: screw thread.

1: binder 3: incline.

4: cavity 5: tip-end part.

6: bottom surface 9: this separation plane.

□ Details of the Invention

■ Purpose of the Invention

• The Technical Field to which the Invention belongs and the Prior Art in that Field

The invention relates to the helical implant. And it is about the helical implant in which the micropatterning (micro patterning) is specifically mainly formed at the dentistry within the bone tissue including maxilla or mandible etc. in the screw four sides of the helical implant which is implanted.

In order to acclimate to the growth of the jaw bone, inducement is gradually fallen according to the order that becomes from the constant point of time and the permanent tooth becomes in the location of the fallen inducement as described above. But it was not regenerated if the permanent tooth was first of all fallen. Therefore, the medical science surgical operation for offering substitute in the loss of the permanent tooth by the superannuation of the permanent tooth or the accident developed. The bridge surgical operation, processing the tooth near to the permanent tooth fallen to the surgical operation and partial denture or the whole prosthese

surgical operation that operates when the adjacent tooth supporting the bridge does not exist are publicly announced.

But since the bridge surgical operation processes the tooth near to the fallen tooth, the healthy tooth is damaged. Problem including the partial denture etc. has and bring about the foreign body sensation formation, prosthese and damage of the connected and healthy tooth while in the whole prosthese, the inconvenience of mounting and dismounting in oral exists the implant operation is used in the of late.

It is commonly called to operate method enabling the healthy tooth in which the artificial tooth root is out dined in the world to fixture and of the permanent tooth which the implant is mainly deprived in the dentistry and reacquisition of the oral cavity or the fixture. It is commonly called to the same sensation as the specifically fallen permanent tooth and surgical operation or the fixture which the artificial tooth root mainly formed into the special material including hydroxyapatite or the titanium material etc. is transplanted to the bone tissue of the fallen permanent tooth as described above in order to offer function and sticks together and 1970 's is developed variously into the point of time and it is performed a surgical operation.

The helix (screw-shaped) implant in which the various configurations of changed examples is publicly announced but the screw thread is mainly formed outside implant initiatives, implant is used as the enlarged diagram showing the screw four sides of the fig. 6 silver conventional implant. As shown in the figure, in the conventional helical implant, the screw four sides (10a) of the screw thread (10b) is formed into the even side in which the surface treatment does not operate and as to the screw four sides (10a) of two screw thread (10b), neighbor 60 is generally approximately formed into angle.

As to fig. 7, the cross-sectional view fig. 8 showing the conventional implant shows the working example of implant in the transverse cross section showing the conventional implant but this is stated clearly in EPEP19920850168. As shown in the figure, the conventional implant comprises the space side (clearance surface) in which the pulverized jaw bone organization is formed in the outside cylinder surface (outer cylindrical surface) of cavity and the cavity: which is the enclosing (contain) and which is separated inside the jaw bone organization the tip-end part (cutting edge):, making something autogenous the female screw groove the tip-end part and micro angle and which binder mainly after-edge is connected in the loss of the dens incisivus (jaw bone) within the jaw bone as to the helix titanium binder (screwed-shaped titanium anchoring member) for the persistent mount of the bridge or prosthese.

If the helix titanium binder (1) rotates, the tip-end part (5) formed in bottom rotates. And the female screw groove in which the jaw bone organization is pulverized to the circulation of the tip-end part (5) the contact and which is coincided with the screw thread becomes within the jaw bone with the self-generation (self-tapping) and the facilitate dining out of the binder (1) is induced. It is in the cavity (4) the enclosing (contain) and the jaw bone organization which is pulverized (scraped-off) as described above is in the brain which is contiguous for hour which the occlusal pressure does not add after the surgical operation termination the symphysis.

The bottom surface (6) (end surface) of the binder (1) is formed into the plane. Moreover, as to the outer side surface and bottom surface (6) of the binder (1) bottom part, the cone angle 15~40 are preferably included to the cone (conical) of angle and the incline (3) is formed. When the binder (1) rotating and being laid within the jaw bone, the incline (3) the right dining out location of the binder (1) the conduction (guiding). Moreover, it is the tip-end part (5) and micro angle space (bevelled) and it is connected the backend (behind) and the space side (9) drops the compression effect (squeeze effect) of the jaw bone in the pressurized circulation of the binder (1).

But there is a problem that in the conventional implant, the problem that the screw four sides of the screw thread leveled and broad and the contact area with the brain was limited and the problem of thus accompanying and reducing the mechanical bonding between the jaw bone and implant had. The specific volume of implant diminishes to the formation of cavity and the supporting force of implant is demoralized.

Moreover, there is a problem that the contact gap which is directly connnected to the circulation of the tip-end part with the success rate of the problem, that the adjacent tissue of the jaw bone can be damaged and implant operation can be created in the bone tissue and implant.

• The Technical Challenges of the Invention

The present invention is to provide the helical implant is worked out in order to solve the problem as described above, and it applies the micropatterning (micro patterning) to the screw four sides of the helical implant and in which the object of the present invention can embody the contact area increase and mechanical bonding rising of implant, and the stress concentration is controlled and it physiologicals, decentralizing the load (physiological load).

■ Structure & Operation of the Invention

As to the helical implant in which the screw thread is formed, the screw four sides of the screw thread characterizes to include one or more concave portions and the concave portion characterizes to be formed into the polygonal cross-section in which a part is opened to outside.

Moreover, as to the helical implant in which the screw thread is formed, the screw four sides of the screw thread characterizes to include one or more concave portions and protrusion and the concave portion and protrusion characterize to be formed into the bowl-shaped section of the length and the same curvature.

The preferred embodiment of the helical implant according to the present invention is explained particularly with reference to the drawings attached below. The attached drawing technicals of the invention for specifically explaining the preferred embodiment toward the creative work of the technical mapping of the present invention, the range of the creative work is not limited with the drawing or the description referring to the drawing.

In the helical implant according to the present invention, one or more concave portions or protrusion is composed in the screw four sides formed outside implant.

As to the figures 1 through 3, the concave portion and protrusion defineds as the triangle formed in the screw four sides of helical implant according to the respective invention, and the cross-sectional view showing stepped and arc pattern as the micropatern (100a, 100b, 100c, 100d) (micro pattern) the screw four sides leveling and broad the patterning and is formed. Specifically, while the concave portion defineds as the pattern formed into the inside of the screw four sides, protrusion defineds as the pattern formed into the outside of the screw four sides.

The same pattern is the various shape and the thing constituted with the arbitrary number are made possible. And preferably digitally formed in order to multiply the contact area of implant. For example, any size of the several tens or the hundreds ㎛ range including 30㎛, 50㎛, 80㎛, 100㎛, 150㎛, 250㎛ and 300㎛ etc. possibles and it is formed into the pattern of the single shape or the various shapes of patterns is mixed and the size of pattern can be formed.

In the meantime, in case the helical implant according to the present invention is applied to the medical field and it is within the brain (bone) implanted, the minimum micro groove which the bone tissue requires in the growth about 100㎛. Therefore, the same pattern is preferably formed into 150㎛ while being formed into the size more than 100㎛. Moreover, it can be formed into the house (arc) type pattern (100c) etc. and the curvature constants the same pattern is not as shown in the figure in other words limited as patterns (100a, 100b) of the polygonal cross-section to the specific geometry.

As to as to fig. 4, the micropatern of the helical implant according to the present invention, the shape and number including the triangle pattern (100a), the step type pattern (100b) and arc pattern (100c) etc. is not

limited to the cross-sectional view showing the mixed mode pattern formed in the screw four sides of the helical implant according to the present invention. The formation of the mixed mode pattern (100d) in which a plurality of patterns is combined moreover as shown in the figure possibles besides the arrangement of the micropatern of the specific geometry.

Moreover, in order to preferably improve the processing efficiency since if the number is increased, the contact area of implant is remarkably rised but the processing time is on the contrary expnded, it considers the environment variable for the surgical operation environment and implant property including the length of implant and cross-sectional area and thread pitch etc. and it takes into consideration the shape of pattern and size and number etc. and pattern enforces patterning.

In the meantime, material including hydroxyapatite etc. is used commonly to the material of implant the hard tissue and which easily can have connection with the regenerated brain while affinity with the brain excellents. But limit has in the dynamic intensity and hydroxyapatite requires increase. Therefore, cross section implant it is not limited to the specific material but the corrosion resistance and the material of the helical implant according to the present invention preferably uses the pure Titanium or the superstrength Ti alloy (titanium alloy) material.

Therefore, since in the helical implant followed the preferred embodiment of the present invention, the formed implant processes to the high intensity titanium material in the hundreds ㎛ unit or less, the hyperfine processing is used for patterning. The different technology which is publicly announced the laser beam processing or the lithography etc. can be used as the hyperfine processing but it is not limited in the example stated clearly in.

It is possible that as to fig. 5, the hyperfine processing technology as shown in the figure processes the medical science material including the catheter tube (50) etc. to the enlarged diagram showing the appearance micro-processing the catheter tube to ㎛ unit. Generally, the screw four sides (10a) of implant is formed into the hundreds ㎛ unit. Therefore, in order to apply patterning to the screw four sides of the helical implant according to a preferred embodiment of the present invention, the hyperfine processing technology which it preferably preferablies based on the MEMS (MEMS, Micro-Electro Michanical Sysyem) and network Nerminator (NT, Nano Technology) is used.

The publicly known pole ultrashort laser precision-machining using the laser light-emitted to the hyperfine processing technology in the source module of the optical system (Optics) is used. It grafts the femtosecond laser operation technique on the confocal optical microscope and galvano-mirror scanning device and it outputs the laser pulse to approximately, the laser pulse width of 100 femto seconds (100Femtosecond, 1 second of 10 coarse dust) within the time of 60 picoseconds (60Picosecond, 6 second of 1000 hundred million minute) to the output of 10 gigawatts (10Gigawatt, 100 hundred million Watt) and the pole ultrashort laser precision-machining processes the medium to nano (nano, and 1 / milliard) unit.

The application in bio and field of medicine including the pole ultrashort laser precision-machining is the biological tissue etc are made possible. And since per second processing the titanium or the sapphire medium to the process speed and the rised precision of 2㎛, it can be applied to the surface manufacturing of the helical implant formed into the titanium according to a preferred embodiment of the present invention or the Ti alloy.

The formation of micropatern accompanies the change of the contact area of the screw four sides (10a). When the screw four sides 600㎛, the pitch 600㎛, and four sides bevel 60 for example pattern the pattern of one regular triangle in the total length 10㎜, and the helical implant of the cross-sectional view diameter 4㎜ in one screw four sides, the implant area in which the bone tissue can touch is rised about 200%. Moreover, when patterning 400%, and three regular triangle patterns when patterning two regular triangle patterns, 600% is rised and the implant area which can be in this case generally touched about the patterning number n with the bone tissue per the screw four sides is rised to 200 n (%).

Moreover, in the amount (bone volume inside threads) of the brain flowing in due to the rised contact area as described above between the screw thread (10b) is the several tens ㎛ level, it is increased to the maximum fifty times.

The desirable working example of the helical implant according to the present invention was explained particularly as the or more but the creative work of the technical mapping of the helical implant according to the present invention is not limited to the working example and the above-described drawing. And as to correction by the excitation person or the equivalent structure, of being changed the Han who does not escape the thought or the range of the invention described in the patent claim possibles the normal knowledge in the technical field in which the invention belongs in the various change, and substitution and change.

■ Effects of the Invention

The helical implant according to the present invention has the effect that the effect that the contact area and mechanical bonding of the dining out site are rised has. The total amount of the brain occupying the screw thread interval is increased and the contact gap of the dining out site and implant diminishes. Moreover, it has the effect that the stress concentration of implant is controlled and the load of the dining out site is decentralized. It physicals of the site adjacent to the dining out site, damage is prevented.

Moreover, the helical implant according to the present invention is the application in the former medical field which is prevented to be released and applies the brain (bone) including the orthomolecular medicine etc. to the dining out site of implant are made possible. And it has the effect that in the non medical science field, it can be applied to any dining out system including the fixture in which the helix outer tube is formed.

 Scope of Claims

Claim 1 :

The helical implant which is characterized in that the screw four sides of the screw thread as to the helical implant, in which the screw thread is formed includes one or more concave portions.

Claim 2 :

The helical implant, wherein the concave portion as to the first claim it is formed into the polygonal cross-section in which a part is opened to outside.

Claim 3 :

The helical implant which is characterized in that the screw four sides of the screw thread as to the helical implant, in which the screw thread is formed includes one or more concave portions and protrusion.

Claim 4 :

The helical implant, wherein the concave portion as to claim 3, and protrusion it is formed into the bowl-shaped section of the length and the same curvature.

Claim 5 :
The helical implant of claim 2 or 4, wherein the concave portion the length of the cross section is 150㎛.

Drawings

Fig. 1

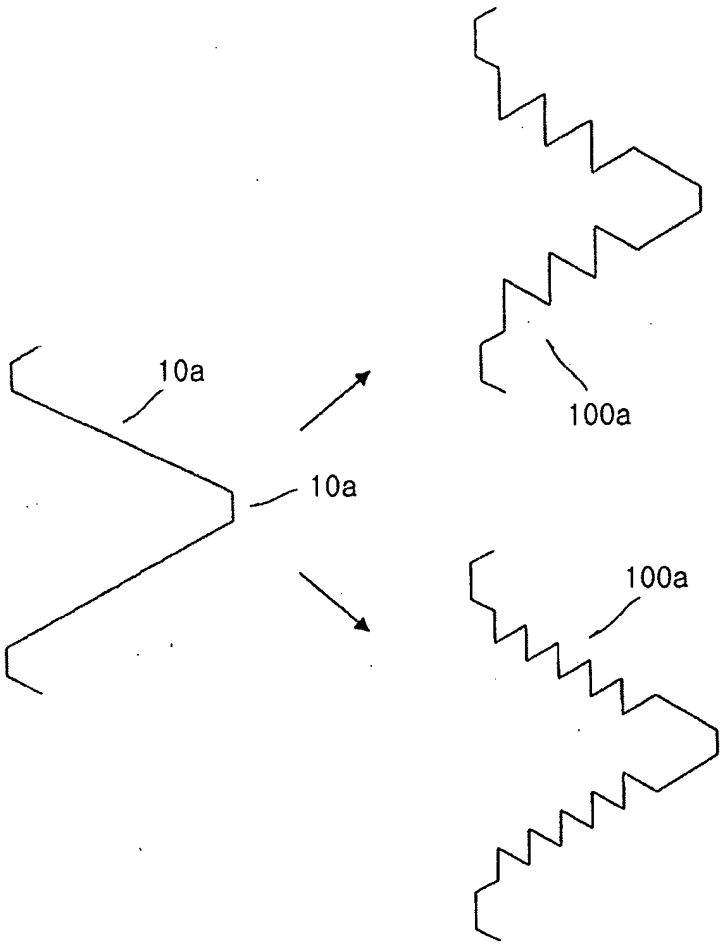


Fig. 2

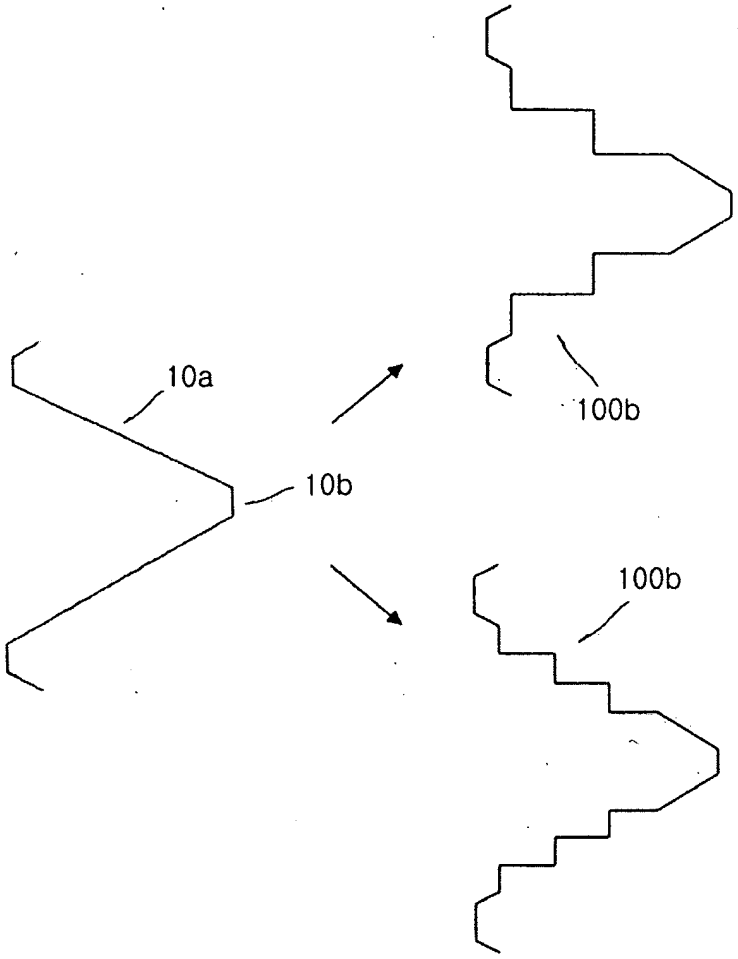


Fig. 3

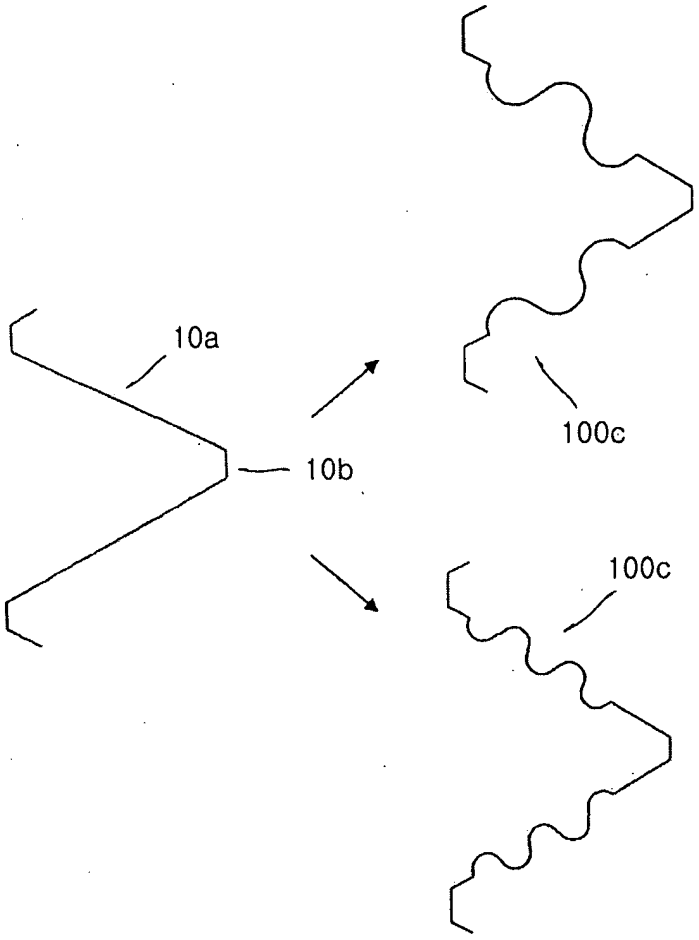


Fig. 4

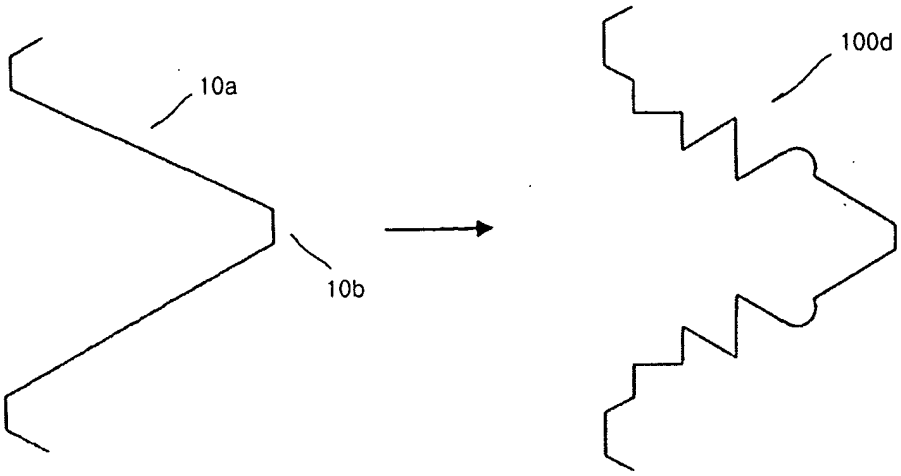


Fig. 5

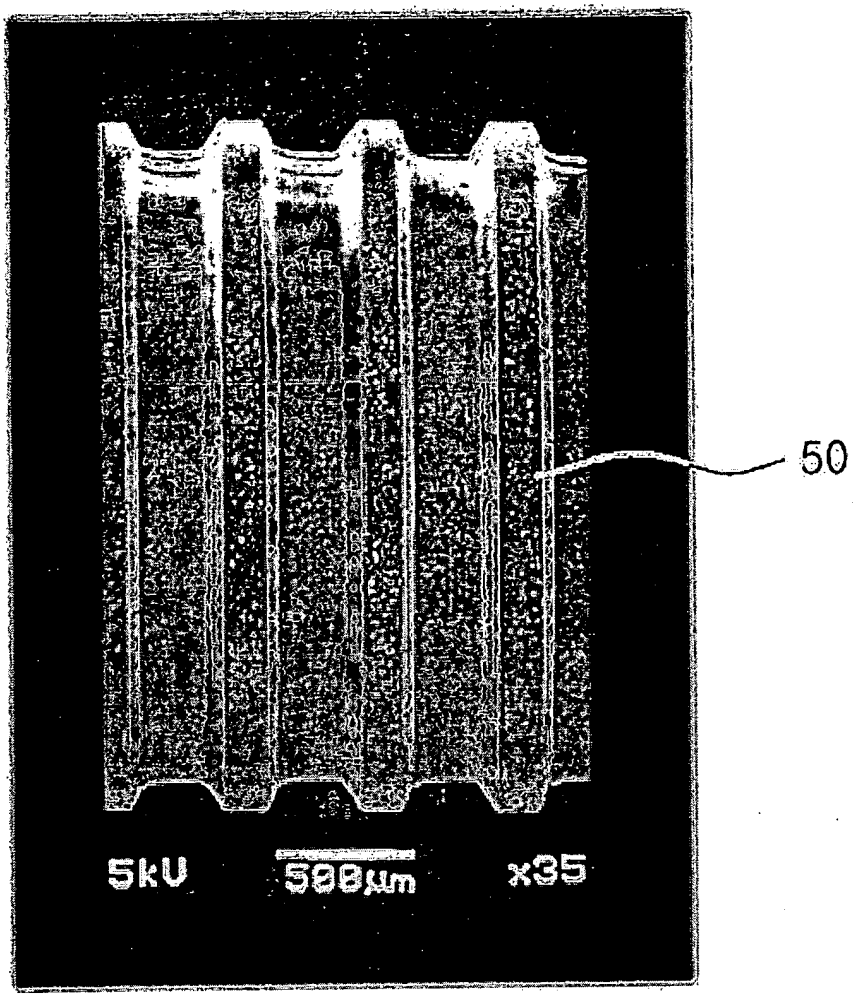


Fig. 6

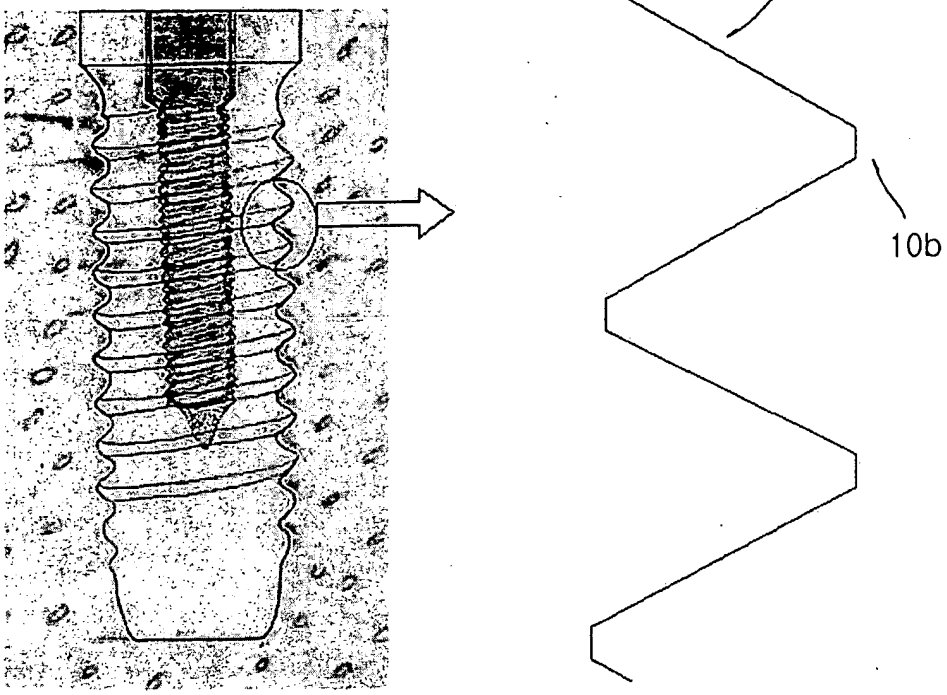


Fig. 7

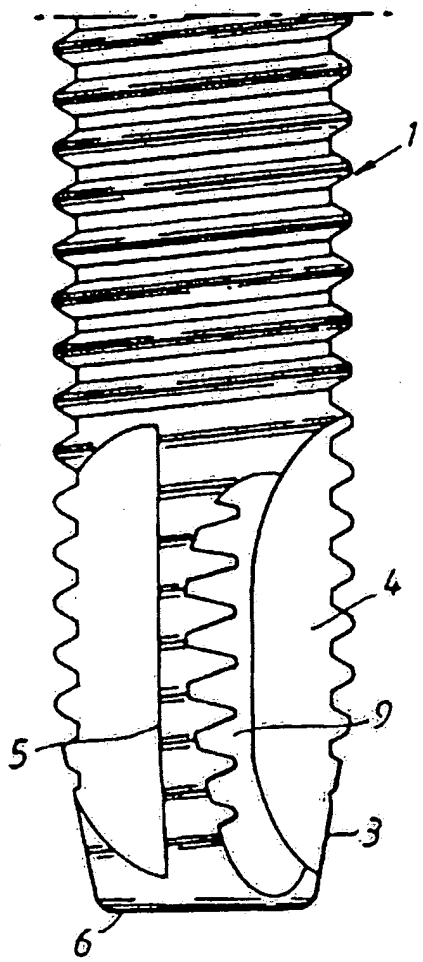
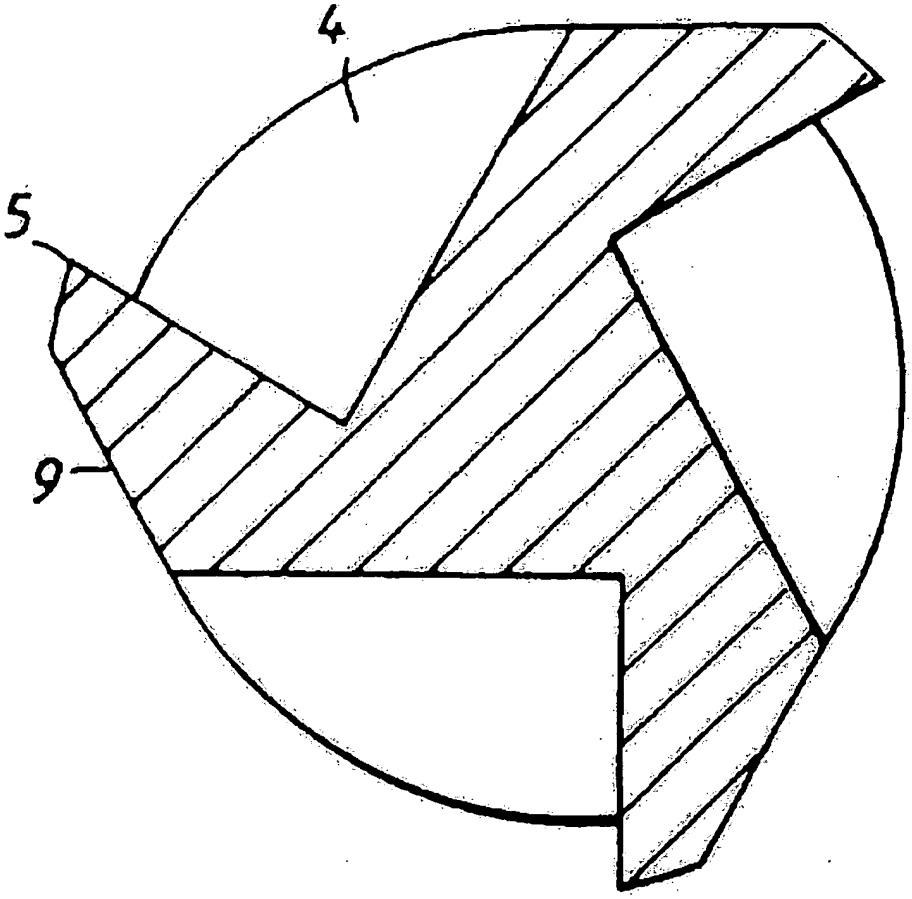


Fig. 8



(19)대한민국특허청(KR)공개특허공보(A)

(51) Int.Cl. 6
A61C 8/00
A61C 13/00

출원번호	10-2003-0018745
출원일자	2003년03월26일
공개번호	10-2004-0083995
공개일자	2004년10월06일
대리인	박형근
발명자	설영택
출원인	설영택
심사청구	있음
발명의명칭	나선형 임플란트

요약

본 발명은 나선형 임플란트에 관한 것으로, 본 발명에 따른 나선형 임플란트는 나사산이 형성된 나선형 임플란트에 있어서, 상기 나사산의 나사사면은 한개 이상의 요함부를 포함하는 것을 특징으로 한다.

본 발명에 따른 나선형 임플란트는 매식부위와의 접촉면적을 증가시켜 임플란트의 기계적 결합력을 강화시키고 매식부위의 로드를 분산시키는 효과가 있다.

대표도

도. 1

색인어

임플란트, 나사사면, 레이저가공, 패턴, 골

명세서

■ 도면에 대한 간단한 설명

도1은 본 발명에 따른 나선형 임플란트의 나사사면에 형성된 삼각형 패턴을 나타내는 종단면도,